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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/664,105	09/19/2000	Robert W. Mason	LYON 0117 PUS	5382

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EXAMINER

OH, TAYLOR V

ART UNIT

PAPER NUMBER

1625

DATE MAILED: 05/14/2002

4

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/664,105

Applicant(s)

MASON, ROBERT W.

Examiner

Taylor Victor Oh

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 December 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 26-52 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 26-52 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

Claim Rejections - 35 USC § 112

Claim 28 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 28, a phrase " an Si-bound hydrocarbon linking group" is written. However, " an Si-bound hydrocarbon" is vague as to the type of the bonding in the compound. An appropriate correction is required.

In claim 37, a phrase " an effective carbamide-cleaving amount of a metal catalyst" is written. However, the term " an effective amount" is indefinite where the claim fails to state the function which is to be rendered effective. An appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

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2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 26-52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okawa (U.S. 5,166,414) in view of Kober et al (U.S. 3,366,662) in view of Faraj (U.S. 5,686,645).

Okawa discloses a process of producing an isocyanate compound from reacting either a formamide compound or an amine compound with dimethyl carbonate in the presence of an alkali catalyst, thereby obtaining a corresponding urethane at a temperature of 0-150⁰ C., and further converting the corresponding urethane by thermal decomposition at a temperature of 150-350⁰ C. (see col. 2 ,lines 59-63) to generate an isocyanate compound (see col. 2 ,lines 36-52). During the reaction process, the amount of dimethyl carbonate to be used is in the range of 1-20 moles per 1 mole of the formamide group of the formamide compound (see col. 5 , lines 13-17). In addition, the Okawa reference has pointed out that the prior art process makes it possible to produce aromatic diisocyanate compounds from aromatic diamine compounds (see col. 5 , lines 3-5).

However, the instant invention differs from the Okawa reference in that diorganocarbonate is diphenylcarbonate, an organic formamide compound is 2,4-bis(N-formamide) of toluene diamine, the reaction takes place in the absence of a catalyst in the phenol solvent, phenol formate ester is recycled to form an organic formamide, the organic formamide is recycled to the reaction mixture with an organic di- or polyamine.

Kober et al disclose a process of preparing isocyanates by reacting an organic carbonate, such as diphenyl carbonate with a diamine such as 5-chloro-2,4-tolylene diamine at a temperature of from 60⁰ to 250⁰ C. ; in addition, during the reaction process , phenol ,one of the by-products, is formed.

The Okawa reference does teach the process of obtaining the isocyanate compound from reacting either a formamide compound or an amine compound with an organic carbonate, such as dimethyl carbonate in the presence of an alkali catalyst, producing a corresponding urethane , and further thermally decomposing the urethane compound to obtain the desired compound whereas Kober et al do disclose the process of preparing isocyanates by reacting diphenyl carbonate with a diamine such as 5-chloro-2,4-tolylene diamine at a temperature of from 60⁰ to 250⁰ C. Their reaction processes share a common reaction mechanism with either dimethyl carbonate or diphenyl carbonate belonging to commonly known organic carbonates. Furthermore, The Okawa reference does indicate the equivalency between the use of formamide compound and the amine compound in the reaction process.

In reference to the organic formamide compound being 2,4-bis(N-formamide) of toluene diamine, the Examiner has noted applicant's argument. However, according to the Faraj reference, this compound is well-known to be used as a reactant (see col. 3 , line 11) in the synthesis of isocyanate precursors ; in addition, carbamates may be cracked to generate isocyanates (see col. 1 , lines 10-13).

With respect to the reaction process in the absence of a catalyst, the Examiner has noted applicant's argument. However, the presence or the absence of the catalyst

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in the reaction process determines the rate of the reaction , not necessarily is connected to the novelty of the current invention unless there is a unexpected result happened in the case of the absence of the catalyst during the reaction process. Therefore, the absence of the catalyst does not have any patentable weight over the prior art reference.

Concerning phenol formate ester recycled to form an organic formamide and the organic formamide recycled to the reaction mixture with an organic di- or polyamine, the Examiner has noted applicant's argument. However, this step is directly related to the optimization of the process, thereby increasing the efficiency of the process and decreasing the cost of the operation. Therefore, if the skillful artisan in the art had desired to produce the isocyanate compound efficiently, it would have been obvious for the skillful artisan in the art to have recycled phenol formate ester to form the organic formamide and the organic formamide to the reaction mixture with the organic di- or polyamine in the combined Okawa's process and Kober et al's process.

Therefore, if the skillful artisan in the art had desired to produce the isocyanate compound by using alternatively well-know reactants such as the formamide compound and diphenyl carbonate, it would have been obvious for the skillful artisan in the art to have employed Faraj 's 2,4-bis(N-formamide) of toluene diamine and Kober et al's diphenyl carbonate in the Okawa's process, thereby obtaining the desired product with an expectation of success as disclosed in the Okawa reference.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Morschel et al (U.S. 3,190,905) disclose a method of preparing aliphatic monoisocyanates by reacting N,N'-dialkyl urea with diaryl carbonates at a temperature higher than 200° C.. As a result of the reaction process, an alkyl isocyanate, an alcohol, and phenol are formed.

Romano et al (U.S. 4,100,351) disclose a method of preparing aromatic urethanes by reacting a dialkyl carbonate with acetanilide in the presence of titanium tetraphenolate. The reaction takes place at a temperature of from 50° to 200° C.

Brill (U.S. 3,763,217) disclose a process of producing an N-substituted carbamate which comprises reacting diphenyl carbonate with a primary or secondary amine at 20° to 250° C. in the presence of a Lewis acid catalyst, thereby forming the carbamate, which can be further treated by heating to produce the isocyanate.

Barclay et al (U.S. 3,054,819) disclose a method of producing organic isocyanates by the reaction of phosgene and an amine in an inert organic solvents such as toluene.

Gurgiolo (U.S. 4,268,684) disclose a method of the preparation of carbamates by reacting an organic carbonate with an aromatic amine in the presence of zinc salts at a temperature of at least 200° C..

Any inquiry concerning this communication or earlier communications from the examiner should be directed to T. Victor Oh whose telephone number is (703) 305-

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0809. The examiner can normally be reached on Monday through Friday from 8:30 to 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alan Rotman, can be reached on (703) 308-4698. The fax phone number for the organization where this application or proceeding is assigned is (703) 308-4556.

OPV
5/13/02

Alan L. Rotman
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